There are 17 fire districts in the county that provide services to most urban areas. Fire protection within Kingman is provided by the Kingman Municipal Fire Department, which has 4 fire stations, 35 firefighters, and 29 volunteers (City of Kingman Community Perspectives, updated January 2000). The Pinion-Pine Fire District reports that although Wikieup is not within its fire district, the District normally responds to fires, car accidents, and other emergencies along the US 93 corridor. In an emergency, firefighters could reach Wikieup in about 45 minutes. The District also is on call to respond to wildfires throughout the state.

Law enforcement is provided throughout the county by the Mohave County Sheriff's Department and by municipal police departments. The County Sheriff's Department has 234 employees (127 located in Kingman). There are 35 Sheriff's officers assigned to the Kingman area. The main county correction facility holds 290 individuals.

Wikieup obtains drinking water from nearby wells and relies on leach fields or septic systems for wastewater disposal.

Mohave County Emergency Plans

Mohave County has an Emergency Operations Plan that provides a framework for rapid response to peacetime disasters. This plan defines local emergencies as the existence of conditions of disaster that are likely to be "beyond the control" of the services of a political subdivision. The plan provides for a range of disaster-related efforts, including emergency health care, evacuation, damage assessments, provision of food and clothing, and other services. It also includes a Hazardous Materials Emergency Response Plan.

Electric and Magnetic Fields

The proposed power plant would interconnect with the existing Mead-Phoenix Project 500-kV transmission line. Both current and voltage are required to transmit electrical energy over a transmission line. The voltage is expressed in volts and is the source of an electric field. The current, a flow of electrical charge measured in amperes (amps), is the source of a magnetic field. The electric and magnetic field effects of the Mead-Phoenix Project were addressed in the *Environmental Analysis of the Changes to the Proposed Mead-Phoenix Transmission Project*, issued by Western in September 1989 (Appendix G). The calculated electric field for the Mead-Phoenix Project 500-kV transmission line is 8.2 kilovolts/meter (KV/m) at the centerline of the right-of-way and 1.7 KV/m at the edge of the right-of-way. A 60-hertz magnetic field is created in the space around the transmission line conductors by the electric current flowing in the conductors. The magnetic field is expressed in units of gauss or milligauss (mG), where 1 milligauss is 1/1,000 of a gauss. The maximum magnetic field calculated for the Mead-Phoenix Project 500-kV transmission line when it is carrying 1,000 amps is 168 mG at the center of the right-of-way. At the edge of the right-of-way, the magnetic field was calculated to be 36 mG.

3.17.2 Environmental Consequences

3.17.2.1 Identification of Issues

Public safety and service issues related to this Project include the following:

- potential for increased electromagnetic radiation
- potential impacts on traffic flow and safety from transportation of plant components, equipment, and construction materials to the site
- potential hazard if ADOT bridge construction coincides with transportation of heavy equipment
- worker and public health and safety, including construction and operation practices

- transportation, storage, and handling of potentially hazardous materials
- effect of increased traffic created by the commuting workforce
- gas pipeline operational safety (including low probability/severe consequence catastrophic accidents
- increased demand for police and fire protection, and emergency medical services.

3.17.2.2 Significance Criteria

Impacts on public safety and services would be considered significant if any of the following were to occur:

- traffic associated with the Project substantially degrades the LOS on US 93 or traffic safety substantially deteriorates
- substantial adverse effects occur to public or worker health and safety
- substantial deterioration of public services occurs
- substantial increases in electric and magnetic fields occur

3.17.2.3 Impact Assessment Methods

Impact assessment methods are directly tied to applicable regulations or standards and vary according to the individual issue. For electric and magnetic fields, impacts were assessed by comparison to the original analysis conducted for the Mead-Phoenix Project. Impacts related to increased construction traffic (both for equipment deliveries and commuting workers) were assessed by determining if the Arizona Department of Transportation (ADOT) has safety concerns or if ADOT expects that the LOS on nearby highways may be "downgraded" to reflect increased congestion. The same standard was used to determine if commuting operating workers would increase traffic along I-40 or US 93 to unsafe levels.

For the handling and storage of hazardous materials or other waste, potential impacts were estimated by identifying if (during construction and operation) site contractors would comply with Federal, state, and local regulations. Potential impacts of gas pipeline construction and operation are directly related to strict compliance with applicable US Department of Transportation regulations. Impact assessment methods also showed if facility construction and operation would place demands on local or regional public services, such as police or fire protection.

3.17.2.4 Actions Incorporated into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action includes the following measures to reduce or prevent potential adverse environmental impacts to public safety and services:

- proper design of plant facilities
- onsite fire protection
- onsite security
- preparation of Health and Safety Plan and Procedures including the following:
  - safety responsibilities of the site manager
  - responsibilities of the Public Health and Safety Officer
  - use of safety equipment for workers
  - worker training
- proper hazardous materials and waste handling and disposal
- SPCC/HMSPC Plans

- Emergency Plans
- coordination with ADOT and provision of turnouts on routes traveled by heavy loads.
- pipeline testing and inspection

3.17.2.5 Impact Assessment

Proposed Action

Electric and Magnetic Fields

The interconnection and wheeling of power on the Mead-Phoenix Project 500-kV transmission line from the proposed power plant would not increase the maximum current that the transmission line is capable of carrying because the Mead-Phoenix Project 500-kV transmission line would still operate within its maximum working range. The interconnection and wheeling of power on the Mead-Phoenix Project 500-kV transmission line would not change the voltage and, therefore, the electric fields would not change.

However, the proposed interconnection, substation, and power plant would each create electric and magnetic fields (EMF) within areas currently not subjected to fields. These areas include the new tap line connecting the Mead-Phoenix Project 500-kV transmission line with the proposed power plant and substation. The proposed new tap lines, each shorter than 500 feet, would generate EMF at the same strengths of the Mead-Phoenix Project 500-kV transmission line.

Western addressed electric and magnetic fields and effects for a 500-kV transmission in the EIS for the Navajo Transmission Project (NTP) (DOE/EIS-0231, Draft issued September 1996, Final issued August 1997). Information on EMF from the NTP EIS is incorporated by reference and included in Appendix G. The electrical effects of the proposed transmission line interconnection would be the same as the effects addressed for NTP. These effects include corona effects and field effects. Corona is the electrical breakdown of air into charged particles; it is caused by the electric field at the surface of the conductors. Effects of corona are audible noise, radio and television interference, visible light, and photochemical oxidants. Field effects are induced currents and voltages, as well as related effects that might occur as a result of EMF at ground level. The corona and field effects for the proposed Big Sandy transmission line additions would be similar to those predicted for NTP. The level of noise at the edge of the right-of-way of the new interconnecting lines and the fence line for the proposed substation would be less than the noise generated by the proposed power plant, and thus would not be detectable.

Since the issuance of the NTP EIS, more research has been conducted examining long-term health effects. There is considerable uncertainty about the EMF/health effects issue. The following have been established from the available information by Western:

- Any exposure-related health risk to the exposed individual likely would be small.
- The most biologically significant types of exposures have not been established.
- Most health concerns are about the magnetic field.
- The measures employed for such field reduction can affect line safety, reliability, efficiency, and maintainability, depending on the type and extent of such measures.

No Federal regulations have been established specifying environmental limits on the strengths of fields from power lines. However, the Federal government continues to conduct and encourage research necessary for an appropriate policy on the EMF issue.

In the face of the present uncertainty, several states have opted for design-driven regulations ensuring that fields from new lines are generally similar to those from existing lines. Some states (Florida, Minnesota, New Jersey, New York,

and Montana) have set specific environmental limits on one or both fields in this regard. These limits are, however, not based on any specific health effects. Most regulatory agencies believe that health-based limits are inappropriate at this time. They also believe that the present knowledge of the issue does not justify any retrofit of existing lines. No regulations have been established in Arizona.

Before the present health-based concern developed, measures to reduce field effects from power line operations were mostly aimed at the electric field component, whose effects can manifest as radio noise, audible noise, and nuisance shocks. The present focus is on the magnetic field because only this type of field can penetrate building materials to potentially produce the types of health impacts that are of concern. It is important to note when considering the effects of magnetic fields from power lines that an individual in a home could be exposed for short periods to much stronger fields while using some common household appliances (National Institutes of Environmental Health Sciences [NIEHS] and DOE 1995). Scientists have not established which of these types of exposures would be more biologically meaningful in the individual. High-level magnetic field exposures regularly occur in areas other than the power line environment.

Western and the EPRI, formerly Electric Power Research Institute, continue to review the results of EMF and health-related research. The results of recent research and reviews follow.

In June, 1999 the NIEHS released its report *Health Effects From Exposure to Power-line Frequency Electric and Magnetic Fields* (NIEHS 1999). The report's Executive Summary concludes that

> "extremely-low-frequency electric and magnetic field (ELF-EMF) exposure cannot be recognized as entirely safe because of weak scientific evidence that exposure may pose a leukemia hazard. In our opinion [NIEHS], this finding is in sufficient to warrant aggressive regulatory concern. However, because virtually everyone in the United States uses electricity and therefore is routinely exposed to ELF-EMF, passive regulatory action is warranted such as a continued emphasis on educating both the public and the regulated community on means aimed at reducing exposures. The NIEHS does not believe that other cancers or non-cancer health outcomes provide sufficient evidence of a risk to currently warrant concern."

Nevertheless, the report goes on to recommend some actions:

> "In summary, the NIEHS believes that there is weak evidence for possible health effects from ELF-EMF exposures, and until stronger evidence changes this opinion, inexpensive and safe reductions in exposure should be encouraged."

The NIEHS report, submitted to Congress, is the culmination of a long-term commitment of the NIEHS under the Research and Public Information Dissemination (RAPID) Project which began with the Energy Policy Act of 1992. RAPID's objective was to accelerate applied EMF research with a focused program supported by matching funds from the Federal government and the private sector. The electric utility industry provided most of the private sector funds.

The most significant source for the NIEHS report was the NIEHS Working Group Report, which resulted from a nine-day meeting in June 1998. The Working Group considered all literature relevant to the potential effects of power-frequency EMF on health, including cancers of several types, adverse pregnancy outcomes, chronic illnesses (e.g., Alzheimer's disease and amyotrophic lateral sclerosis), and neurobehavioral changes (e.g., depression, learning, and performance). The Working Group found limited support for a causal relationship between childhood leukemia and residential exposure to EMF, and between adult chronic

lymphocytic leukemia and employment in jobs with potentially high magnetic field exposure. Based on this assessment and charged with ranking EMF according to International Agency for Research on Cancer criteria, the Working Group assigned EMF a 2B ranking, which translates to "possible human carcinogen." For all other health outcomes, the Working Group concluded that the evidence was inadequate.

Although regulatory actions are not in the purview of the NIEHS, they suggest that

> "the power industry continue its current practice of siting power lines to reduce exposures and continue to explore ways to reduce the creation of magnetic fields around transmission and distribution lines without creating new hazards. We [NIEHS] also encourage technologies that lower exposures from neighborhood distribution lines provided that they do not increase other risks, such as those from accidental electrocution or fire."

Proposed use of the existing Mead-Phoenix Project transmission line would not lead to increased exposures because the line is in an area that is generally inaccessible to the general population.

Safety Issues Related to Increased Traffic

Construction of the proposed power plant would create short-term effects associated with delivery of steam turbines, combustion turbines, generators, transformers, and other equipment. It also would create short-term effects from the commuting workers. The heavy equipment would be delivered by ship to the Port of Houston, Texas, and then loaded on dedicated rail cars for shipment to Kingman. From Kingman, the equipment shipments would be moved along I-40 east to US 93, then south to the site access road located about 2 miles south of Wikieup. The total distance to be traveled on roadways would be approximately 60 miles.

Shipment of heavy equipment would require an oversize load permit issued by ADOT. Application for this permit would be made directly by the haul contractor and the permit would be in compliance with ADOT General Order No. R17-4 through R17-208 (Rules and Regulations for Over-dimensional and Over-weight Vehicles).

The oversize load application requires submittal of detailed drawing of all overpasses, overhead utility lines, bridges, intersecting roads, and other features that could pose safety problems. ADOT normally requires a "pilot" car with flashing lights that precedes the load, a highway patrol officer, additional supports for bridges, and restrictions on the time of day delivery is made. At an average speed of about 7 miles per hour, each heavy equipment trip would take about 8 hours.

Approximately 45 deliveries of heavy equipment are estimated to be necessary and this would affect traffic along both I-40 and US 93. The heat recovery steam generators likely would be delivered during months 6 through 9, the combustion turbine in construction months 7 through 9. The steam turbines would be delivered in months 8 to 10. Added to this traffic load would be numerous smaller truck deliveries (excluding heavy equipment).

The delivery of oversize loads may require temporary closure of I-40 or US 93. This possibility cannot be assessed by ADOT until formal application is made for an oversize load permit. Caithness has proposed to use special temporary passing lanes or "turn-outs" every mile or so along US 93 that would allow motorists to pass the oversize load with limited delays.

It is estimated that in construction month 7, there would be about 20 heavy equipment deliveries and about 500 additional deliveries of mechanical equipment, electrical equipment, piping, concrete, rebar, and other supplies. The total deliveries for month 7 therefore would be approximately 500 delivery trips. Also during

this month, it is estimated for Phase 1 that there would be approximately 300 construction workers commuting to the site each day. It was assumed that there would be about 1.5 workers per vehicle, so the total number of two-way worker vehicles would be 200 vehicles. The total traffic increase for month 7 would therefore be approximately 700 vehicles.

This increased traffic would represent about 12 percent on US 93 compared to current 24-hour average daily levels. The temporary traffic increase along I-40 would be only about 4 percent. Because of the short-term nature of this traffic increase, ADOT would not expect to downgrade the LOS for either I-40 or US 93. Phase 2 would require additional equipment deliveries and commuting construction workers. However, those levels would be less than estimated for Phase 1.

Strict compliance with all provisions and mitigation imposed by the oversize load permit would ensure that significant traffic impacts do not occur.

The vehicle traffic associated with power plant operations (delivery of supplies and the commuting workforce) would have only a minor effect on traffic. Total daily vehicle deliveries and commuting operators probably would not exceed an average of 30 or 35 vehicles per day.

Construction of the natural gas pipeline through Wikieup would temporarily disrupt local traffic and may increase safety concerns for motorists and pedestrians. In this respect, the Proposed Action would be similar to Alternative R (which would also pass through the town) and less favorable than Alternative T, which would use corridor segment T5.

Potential Hazard if ADOT Bridge Construction Coincides with Project Construction

ADOT would not expect any substantial traffic or safety issues if construction of the new US 93 bridge and the proposed Project were to coincide (Elters 2000).The Proposed Action includes close coordination with ADOT to ensure that bridge construction does not take place when heavy equipment is delivered. Therefore, no significant impacts would occur.

Worker and Public Health and Safety, Including Construction and Operation Practices

Implementation of the specific programs and measures to ensure public health and safety as well as worker safety included in the Proposed Action would minimize adverse effects to public services or worker health and safety to below the level of significance.

Effect of Increased Traffic Created by the Commuting Workforce

The effect of the commuting workforce on traffic is described above. During peak construction of Phase 1, there would be a commuting workforce of about 650 individuals and essentially all of the workers would come from Kingman. With an assumed level of car pooling (1.5 workers per vehicle), this means that the daily two-way peak would be about 430 vehicles. This short-term increase would represent an increase of about 7 percent compared to current traffic along US 93. This effect would be noticeable by area residents but would not be significant. It would not likely cause ADOT to downgrade the LOS for either I-40 or US 93. Phase 2 would require additional commuting construction workers; however, these levels would be less than Phase 1.

Construction workers would not likely use corridor segment R1 (Hackberry Road) because it is unimproved and would be much slower compared to US 93.

Gas Pipeline Operational Safety

After installation, the pipeline would be hydrostatically tested to verify the integrity of the completed steel pipeline system. In accordance with 49 CFR 192 regulations, the hydrostatic test pressure would range from 1.1 to 1.5 times the pipeline's maximum operating

pressure. To accomplish this integrity testing, the pipeline would be hydrostatically tested in sections, at locations to be determined based upon elevation change, and water transferred across sections after testing. The pipeline owner and operator would conduct maintenance of the pipeline. Routine activities primarily would involve inspection for leaks. Inspection of the line would be accomplished in accordance with U. S. Department of Transportation regulations, Part 192.105, 106, and 107.

The pipeline would be patrolled by air every six months. Routine inspection also would be conducted annually using a two-track vehicle or by foot. If leaks were encountered, they would be isolated, exposed, and repaired in accordance with industry practices. Because the potential for a catastrophic event is low, the operation of the pipeline would not result in substantial effects to public or worker safety and therefore there would be no significant impact.

Should a catastrophic event such as a gas pipeline explosion occur, the site construction or site operations manager would immediately contact appropriate staff with Mohave County (Emergency Operations Plan), Arizona (Emergency Response and Recovery Plan), and the US Department of Transportation. Onsite staff would assist these and other agencies with such essential functions as communications, fire fighting, emergency medical assistance, law enforcement, assistance, evacuation, and search and rescue.

Increased Demand for Police and Fire Protection, and Emergency Medical Services

The Proposed Action includes all necessary utilities at the plant site, including security, fire suppression, water supply, wastewater disposal, and emergency medical care. Individuals trained in cardio pulmonary resuscitation (CPR) and emergency medical procedures will be on site. Hazardous waste material would be removed by a licensed contractor and properly disposed in an approved landfill. Therefore, construction and operation of the power plant and ancillary facilities (including the pipeline) would not place significant additional demands on or deteriorate county public services.

Alternative R Gas Pipeline Corridor

The effects of this alternative would be the same as for the Proposed Action except for safety issues related to traffic. Construction would take place generally along US 93 that would also be used for equipment deliveries and by commuting construction workers. These effects would not rise to the level of significance.

Alternative T Gas Pipeline Corridor

The effects of this alternative would be the same as for the Proposed Action except construction of the gas pipeline along the Alternative T gas pipeline corridor would have less of an effect on traffic than the Proposed Action or Alternative R. These effects would be less than significant.

Corridor Segment C2

Use of corridor segment C2 for any pipeline route would not result in any adverse impacts that would differ substantially from the Proposed Action, nor would construction in this corridor segment cause any significant effects.

Communication Facilities

The installation of the OPGW and microwave towers would have little or no effect on public safety and services.

No-Action Alternative

No adverse effects on public safety and services would occur if the No-Action Alternative were adopted.

3.17.2.6 Mitigation and Residual Impacts

No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts. As a result, no additional measures to

mitigate significant impacts have been identified for public safety and services and there would be no residual significant impacts.

3.18 NOISE

This section describes the existing noise environment at and in the vicinity of the proposed power plant site, and assesses potential noise impacts associated with the Proposed Action and alternatives. Noise-sensitive receptors that may be affected by noise are identified, as well as the laws, ordinances, regulations, and standards that regulate noise levels at those receptors. The following discussion describes the results of sound level measurements, acoustical calculations, and assessment of potential noise impacts. Where appropriate, mitigation measures are proposed to reduce potential Project-related noise impacts to acceptable levels.

3.18.1 Affected Environment

Noise-sensitive receptors are land uses associated with indoor and outdoor activities that may be subject to stress or significant interference from noise. They often include residential dwellings, mobile homes, hotels, motels, hospitals, nursing homes, educational facilities, and libraries. Industrial, commercial, and agricultural and undeveloped land uses generally are not considered sensitive to ambient noise. A land use map (Figure 3.7-1) that identifies residences and other land uses where quiet is an important attribute of the environment within the region of influence is located in Section 3.7.

The general area surrounding the proposed power plant site, pipelines, and associated facilities varies from flat areas, to rolling hills, to fairly mountainous and rocky terrain east of the proposed power plant site. The area is primarily open rangeland that is undeveloped or grazed by livestock and/or wild burros. The general area shows evidence of some vehicle traffic; however, the disturbance appears predominantly limited to small areas (e.g., near well sites). The developed uses in the vicinity are limited to the Mead-Phoenix Project 500-kV transmission line, the Phelps Dodge water pipeline, scattered water wells, a clay mining operation, and one residence. The residence is located approximately 1 mile southwest of the proposed power plant site (and directly east of the proposed wells and agricultural use).

Land uses along the proposed pipeline corridor are primarily open space. There are four residences within corridor segment T5 just east of the Big Sandy River crossing. West of the Big Sandy River, there are six residences located within corridor segment T4. Five additional residences are located just outside the corridor, generally located along the highway. There is only one residence located in corridor segment T3. There is one residence along Hackberry Road, but it is outside the corridor.

There are approximately 41 residences dispersed along US 93 (R3, R4, and R5). There is also a small subdivision, Sierra Vista Estates, south of I-40 in T20N, R14W, Sections 12 and 13, which is approximately 0.75 miles west of the Mead-Liberty 345-kV transmission line and one residence just east of corridor segment T2.

3.18.1.1 Fundamentals of Acoustics

Noise generally is defined as loud, unpleasant, unexpected, or undesired sound that disrupts or interferes with normal human activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human response to environmental noise is annoyance. The response of individuals to similar noise events is diverse and influenced by the type of noise, the perceived importance of the noise and its appropriateness in the setting, the time of day and the type of activity during which the noise occurs, and the sensitivity of the individual.

Sound is a physical phenomenon consisting of minute vibrations that travel through a medium, such as air, and are sensed by the human ear. Sound generally is characterized by a number of

variables including frequency and intensity. Frequency describes the sound's pitch and is measured in Hertz (Hz), while intensity describes the sound's loudness and is measured in decibels (dB). Decibels are measured using a logarithmic scale. A sound level of 10 dB is approximately the threshold of human hearing and is barely audible under extremely quiet listening conditions. Normal speech has a sound level of approximately 60 dB. Sound levels above about 120 dB begin to be felt inside the human ear as discomfort and eventually pain at still higher levels. The minimum change in the sound level of individual events that an average human ear can detect is about 3 dB. An increase (or decrease) in sound level of about 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness, and this relation holds true for loud sounds and for quieter sounds.

Because of the logarithmic nature of the decibel unit, sound levels cannot be added or subtracted directly and are somewhat cumbersome to handle mathematically. However, some simple rules of thumb are useful in dealing with sound levels. First, if a sound's intensity is doubled, the sound level increases by 3 dB, regardless of the initial sound level. Thus, for example:

60 dB + 60 dB = 63 dB

80 dB + 80 dB = 83 dB

Hertz is a measure of how many times each second the crest of a sound pressure wave passes a fixed point. For example, when a drummer beats a drum, the skin of the drum vibrates a number of times per second. A particular tone that makes the drum skin vibrate 100 times per second generates a sound pressure wave that is oscillating at 100 Hz, and this pressure oscillation is perceived as a tonal pitch of 100 Hz. Sound frequencies between 20 Hz and 20,000 Hz are within the range of sensitivity of the best human ear.

Sound from a tuning fork (a pure tone) contains a single frequency. In contrast, most sounds one hears in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound according to a weighting system that reflects that human hearing is less sensitive at low frequencies and extremely high frequencies than at the mid-range frequencies. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources that creates a relatively steady background noise in which no particular source is identifiable. A single descriptor called the Leq (equivalent sound level) is used. Leq is the energy-mean A-weighted sound level during a measured time interval. It is the "equivalent" constant sound level that would have to be produced by a given source to equal the fluctuating level measured.

Finally, another sound measure known as the Average Day-Night Noise Level (Ldn) is defined as the A-weighted average sound level for a 24-hour day. It is calculated by adding a 10 dB penalty to sound levels in the night (10:00 p.m. to 7:00 a.m.) to compensate for the increased sensitivity to noise during the quieter evening and nighttime hours. Sound levels of typical noise sources and environments are provided in Table 3.18-1 as a frame of reference.

TABLE 3.18-1
SOUND LEVELS OF TYPICAL NOISE SOURCES AND NOISE ENVIRONMENTS
(A-WEIGHTED SOUND LEVELS)

Noise Source (at a Given Distance)	Scale of A-Weighted Sound Level in Decibels (dBA)	Noise Environment	Human Judgment of Noise Loudness (Relative to a Reference Loudness of 70 Decibels*)
Military Jet Take-off with After-burner (50 ft)	140		
Civil Defense Siren (100 ft)	130	Carrier Flight Deck	
Commercial Jet Take-off (200 ft)	120		**Threshold of Pain** *32 times as loud
Pile Driver (50 ft)	110	Rock Music Concert	*16 times as loud
Ambulance Siren (100 ft) Newspaper Press (5 ft) Power Lawn Mower (3 ft)	100		**Very Loud** *8 times as loud
Motorcycle (25 ft) Propeller Plane Flyover (1,000 ft) Diesel Truck, 40 mph (50 ft)	90	Boiler Room Printing Press Plant	*4 times as loud
Garbage Disposal (3 ft)	80	High Urban Ambient Sound	*2 times as loud
Passenger Car, 65 mph (25 ft) Living Room Stereo (15 ft) Vacuum Cleaner (3 ft) Electric Typewriter (10 ft)	70		**Moderately Loud** *70 decibels (Reference Loudness)
Normal Conversation (5 ft) Air Conditioning Unit (100 ft)	60	Data Processing Center Department Store	*1/2 as loud
Light Traffic (100 ft)	50	Private Business Office	*1/4 as loud
Bird Calls (distant)	40	Lower Limit of Urban Ambient Sound	**Quiet** *1/8 as loud
Soft Whisper (5 ft)	30	Quiet Bedroom	
	20	Recording Studio	**Just Audible**
	10		**Threshold of Hearing**

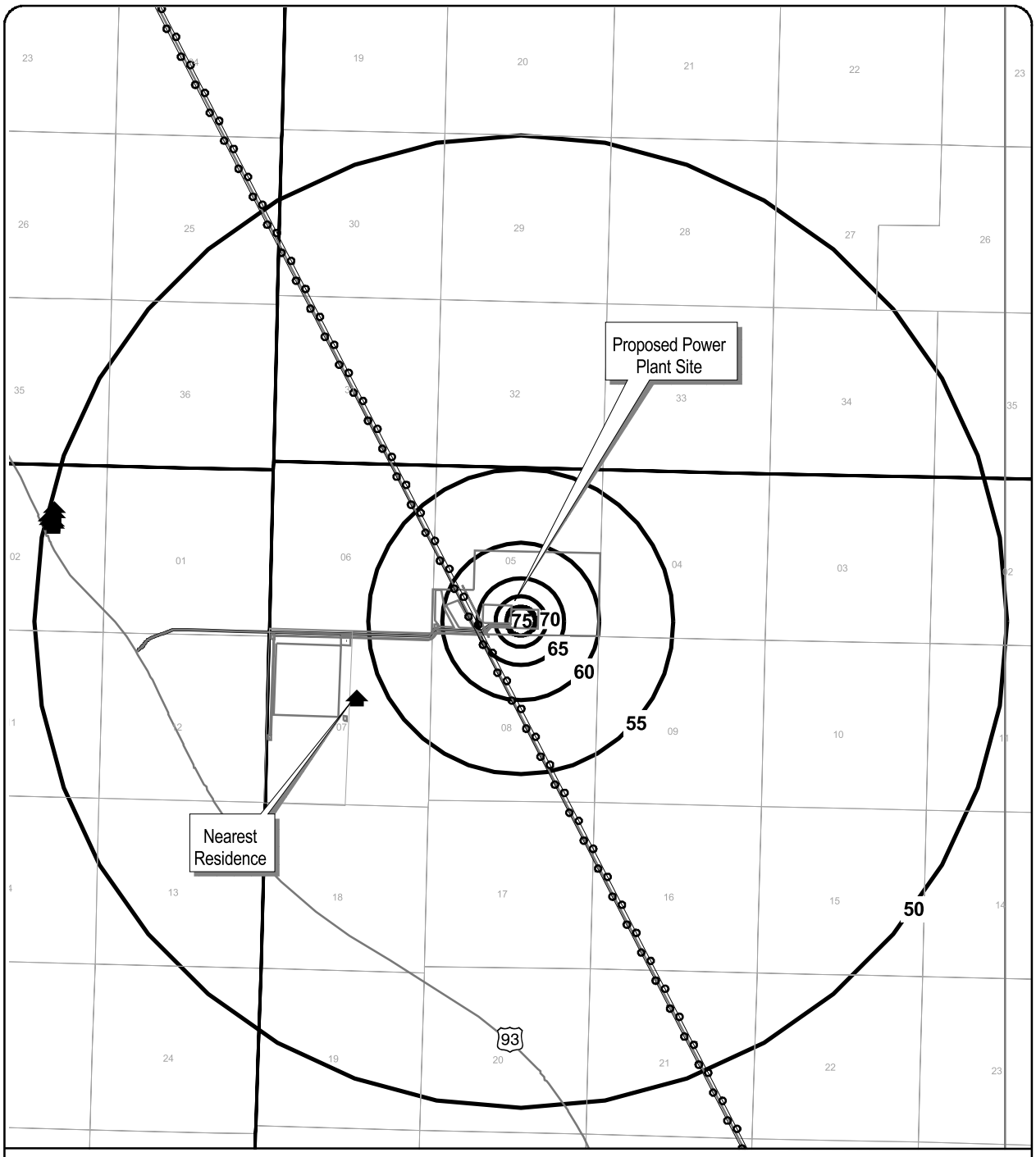
3.18.1.2 Region of Influence

The region of influence is based on the location of noise sensitive receptors, such as residences, relative to the plant, the pipeline corridors, and the communication facility locations, and the radius of the significant noise contours.

3.18.1.3 Existing Conditions

The ambient noise in the vicinity of the Project area is typical of a rural area. Noise was measured for a 24-hour period on Friday, June 9, 2000 at 8:00 a.m. (Caithness 2000). Noise was measured within 150 feet of the nearest residence to the proposed power plant site (Figure 3.18-1). A Metrosonics DB3080 noise meter, set to record the average noise (L_{eq} dBA) in 30-minute intervals, was used to measure the noise. The A-weighted scale was used to measure noise and the slow response option (five measurements per second) was applied.

The general background noise was 42.5 dBA. The exception was when unrelated construction activities (water well drilling and pipeline trench construction) were occurring from 8:00 a.m. to noon. During this time, the average background



Legend

Resource Components

- Noise Impact Contour Values in A-Weighted Decibles (LEQ)
- Residence

General Reference

- Mead-Liberty/Mead-Phoenix Transmission Lines
- U.S. Route

0.5 0 0.5 1

Scale in Miles

Universal Transverse Mercator Projection
1927 North American Datum
Zone 12

Noise Impacts

Big Sandy Energy Project EIS

N

Figure 3.18-1

x:/bigsandy/projects/noise.apr

noise was about 58 dBA. The graphical representation of the 24-hour noise survey is shown on Figure 3.18-2. During the 24-hour period, the average noise was 45.9 dBA. Figure 3.18-3 shows the noise level (51.8 dBA) from 8:00 a.m. to noon when construction was occurring. Figure 3.18-4 shows the background noise (42.5 dBA) recorded from noon until 8:00 a.m. the next morning in the absence of construction activities. This is assumed to be the typical background noise level for the general Project area. Sound levels at specific locations would be dependent on that location's proximity to existing noise sources such as roadways and industrial and agricultural equipment.

3.18.2 Environmental Consequences

3.18.2.1 Identification of Issues

The following issues were identified during the preparation of this noise analysis:

- Potential noise impacts from operation of the proposed power plant.
- Potential noise impacts from construction of all Project facilities including the access road, wells, and natural gas pipeline.

3.18.2.2 Significance Criteria

Significance criteria were based on Mohave County noise standards and EPA noise compatibility guidelines, as described below.

Mohave County

The Mohave County General Plan identifies sound levels that are considered to be compatible with various land uses. Sound levels up to 65 dBA Ldn are considered compatible with residential land uses. Implementation measure N2 of the General Plan "requires developments which generate offsite noise levels in excess of 65 dBA Ldn to mitigate noise levels so they do not exceed the County's standards."

U.S. Environmental Protection Agency

The EPA has published acoustical guidelines designed to protect the public health and welfare with an adequate margin of safety. The guidelines are presented in Table 3.18-2. The guidelines classify the various areas according to the primary activities that are most likely to occur in each. A review of the table shows that an indoor noise environment of 45 dBA Ldn will permit speech communication in homes, while an outdoor Ldn not exceeding 55 dBA will permit normal speech communication. An $Leq_{(24)}$ of 70 dB is identified as protecting against damage to hearing.

Therefore, impacts related to noise would be considered significant if the EPA guidelines of 55 dBA $Leq_{(24)}$ at the nearest residence was exceeded or if the county standard of 65 dBA Ldn would be exceeded.

3.18.2.3 Impact Assessment Methods

The assessment of noise impacts required the identification of Project-related noise sources and the location of noise-sensitive receptors. Acoustical calculations were performed to estimate the noise levels from Project construction and operation at the closest noise-sensitive receptors. Impacts were based on the Project's compliance with applicable noise criteria, as reflected in the significance criteria.

3.18.2.4 Actions Incorporated Into the Proposed Action to Reduce or Prevent Impacts

The Proposed Action incorporates the following noise abatement measures to reduce or prevent impacts:

Noise reduction measures would be included in the design of the turbines and the turbine housing. The air intake system would include silencers to reduce noise from the combustion turbine compressor inlet. The turbines would be contained within an insulated shell to further reduce noise levels.

TABLE 3.18-2
YEARLY AVERAGE EQUIVALENT SOUND LEVELS IDENTIFIED AS REQUISITE TO PROTECT THE PUBLIC HEALTH AND WELFARE WITH AN ADEQUATE MARGIN OF SAFETY

	Measure	Indoor			Outdoor		
		Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects(b)	Activity Interference	Hearing Loss Consideration	To Protect Against Both Effects(b)
Residential with Outside Space and Farm Residences	Ldn	45		45	55		55
	$L_{eq}(24)$		70			70	
Residential with No Outside Space	L_{dn}	45		45			
	$L_{eq}(24)$		70				
Commercial	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Inside Transportation	$L_{eq}(24)$	(a)	70	(a)			
Industrial	$L_{eq}(24)$(d)	(a)	70	70(c)	(a)	70	70(c)
Hospitals	L_{dn}	45		45	55		55
	$L_{eq}(24)$		70			70	
Educational	$L_{eq}(24)$	45		45	55		55
	$L_{eq}(24)$(d)		70			70	
Recreational Areas	$L_{eq}(24)$	(a)	70	70(c)	(a)	70	70(c)
Farm Land and General Unpopulated Land	$L_{eq}(24)$				(a)	70	70(c)

Source: EPA 1974

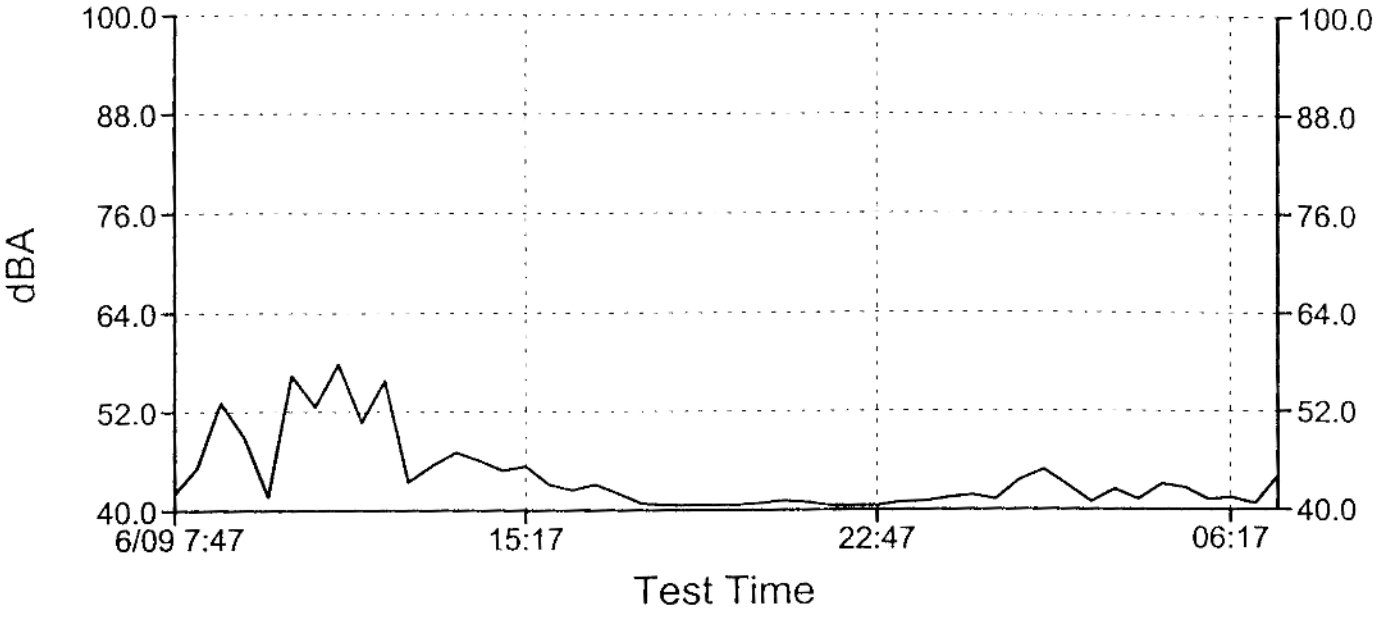
CODE:

(a) Since different types of activities appear to been associated with different levels, identification of a maximum level for activity interference may be difficult except in those circumstances where speech communication is a critical activity

(b) Based on lowest level.

(c) Based only on hearing loss.

(d) An $L_{eq(8)}$ of 75 dB may be identified in these situations so long as the exposure over the remaining 16 hours per day is low enough to result in a negligible contribution to the 24-hour average (i.e., no greater than 1 db.)

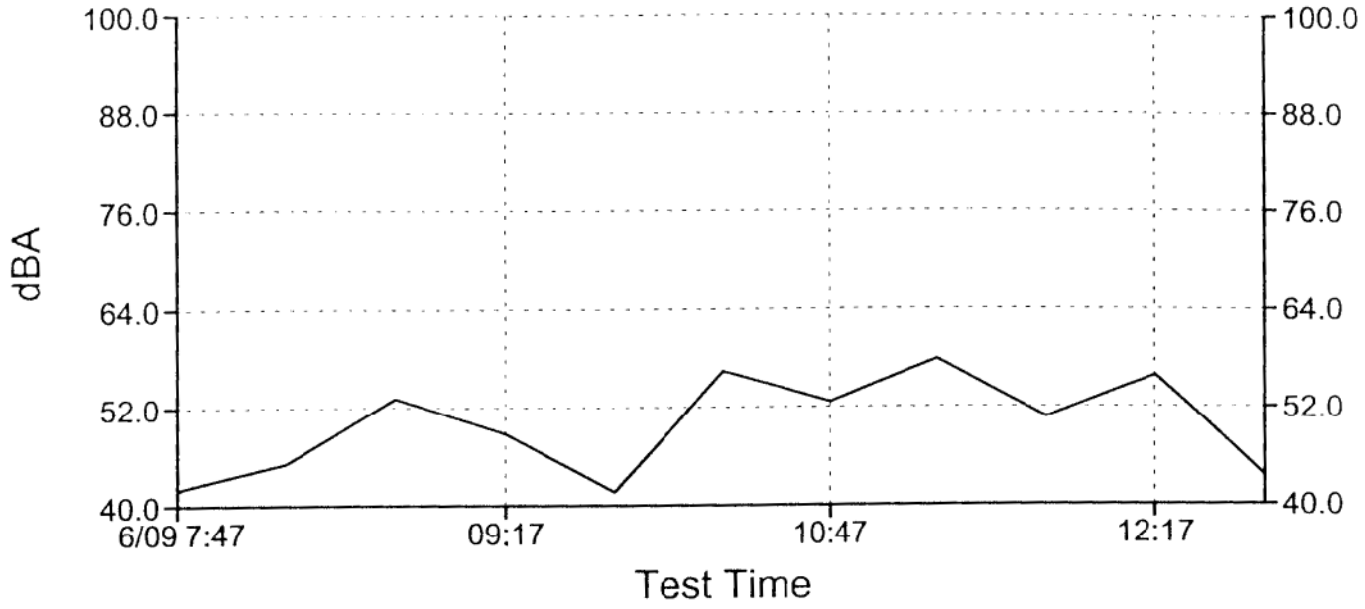


Overall Leq = 45.9db

24-hour Noise Survey Results

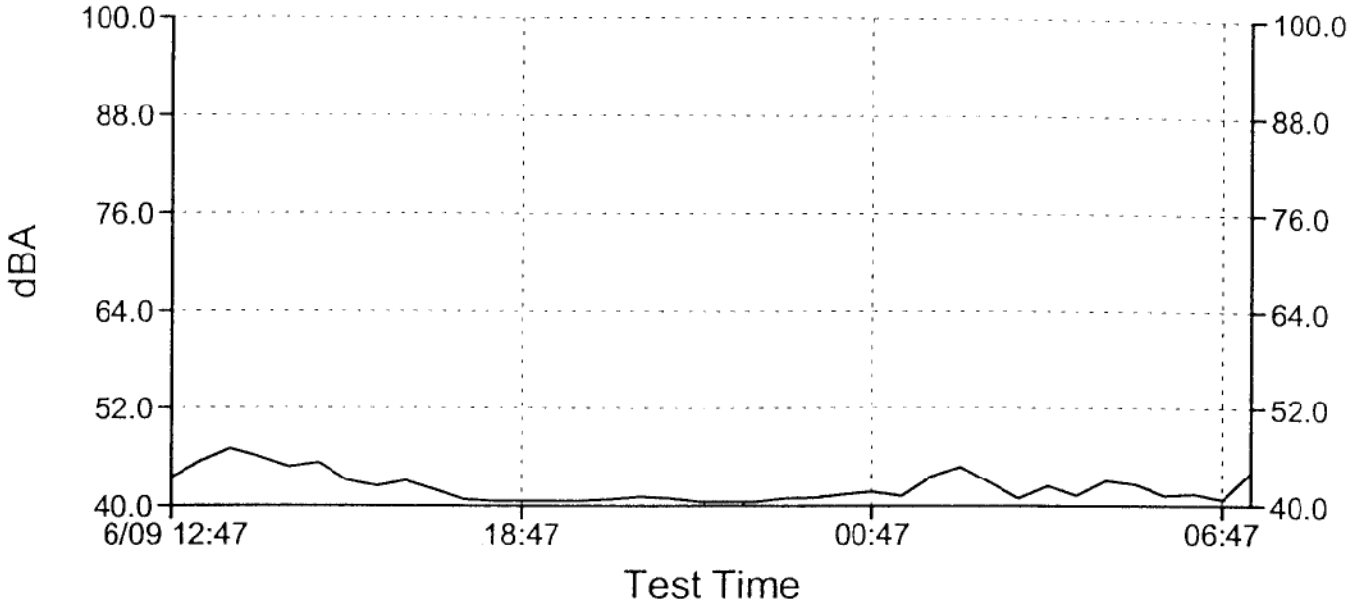
Big Sandy Energy Project EIS

Figure 3.18-2



Overall Leq = 51.8db
During Construction Activities

Noise Survey Results During Construction
Big Sandy Energy Project EIS
Figure 3.18-3



Overall Leq = 42.5db
No Construction Activities

Background Noise with No Construction Activities
Big Sandy Energy Project EIS
Figure 3.18-4

- Construction other than well drilling is anticipated to occur 10-hours per day, 5 days per week, thereby limiting the potential for noise on nights and weekends. Construction equipment would be required to have manufacturer's recommended mufflers.

3.18.2.5 Impact Assessment

Proposed Action

Proposed Power Plant

Construction of the power plant would result in a temporary increase in the ambient noise level in the vicinity of the construction activity. The magnitude of the impact depends on the type of construction activity, noise level generated by various pieces of construction equipment, duration of the construction phase, distance between the noise source and receiver, presence or absence of noise barriers, and time of day. Figure 3.18-5 shows noise levels generated by typical pieces of construction equipment. The construction noise is anticipated to be generated only during daylight hours, and would be temporary.

Noise is produced during the operation of a power plant. The primary noise sources at a typical power plant include combustion turbine generators (CTGs) and associated CTG air inlets, heat recovery steam generators (HRSGs), steam turbine generators (STGs), cooling tower fans, transformer areas, feed pumps (i.e., boiler, return, and circulation), and ancillary switchgear. The overall noise level generated by these components would depend on the physical layout of the facility, numbers of individual equipment units, and mitigation measures incorporated into the facility design.

Equipment needed to operate the proposed power plant has a guaranteed noise limit of 66 dBA at 400 feet from the "noise envelope" of the equipment. The noise envelope encloses the turbines, HRSG, STG, cooling towers, and ancillary equipment. It must be noted that this is the noise at steady state (100 percent load) baseload operation exclusive of transients, startup and shutdown, pulse filter cleaning, HRSG duct firing, steam bypass, atmospheric venting, and other off-normal and emergency conditions. However, this guarantee is for a two-on-one 520-MW configuration (two turbines, two HRSGs, and one STG). As a conservative estimate of the extra one-on-one configuration (one turbine, one HRSG, and one STG planned for Phase 2), it is assumed that the noise estimate of a one-on-one configuration would be similar, although the one-on-one configuration has one less turbine. The proposed configuration is thus assumed to generate approximately 69 dBA Leq at the 400 feet "noise envelope" of the equipment.

Acoustical calculations were performed to estimate the Project-generated sound level at various distances from the power plant fence line. Calculations assumed that the sound level from the Project components would be constant and would decay based on "point source" acoustical characteristics. A point source decays sound at a rate of 6 dB per doubling of distance from the source-receiver pair. This is a logarithmic relationship describing the acoustical spreading of a pure undisturbed spherical wave in air. The effects of atmospheric absorption, ground attenuation, and intervening topography and structures that may further reduce propagated noise levels, were not considered due to many uncertainties. Therefore, the results are considered to be the worst case.

The results of the calculations are summarized in Table 3.18-3. The predicted noise level at 400 feet represents the closest point of the noise envelope to the southern property boundary, and thus represents the highest noise level off the proposed power plant site. Since all other plant facilities would be farther from the property boundary, the predicted noise along the southern property line represents the maximum "fence line" noise. A review of Table 3.18.3 shows that the 65 dBA Ldn Mohave County compatibility requirement is located at approximately 910 feet from the fence line. The EPA 55 dBA Ldn compatibility guideline is located approximately

Table 3.18-3 PREDICTED NOISE LEVELS FROM BIG SANDY POWER PLANT			
Distance from Big Sandy Power Plant (feet)	Average Hourly Noise Level from Big Sandy Power Plant (L_{eq})	Average Hourly Noise Level from Big Sandy Power added to Measured Ambient Noise (Leq)	Total Day/Night Noise Level (Ldn)
Fence line	69.0	69.0	75.4
100	67.1	67.1	73.5
600	61.0	61.1	67.5
910	58.2	58.7	65.0
1,600	55.0	55.3	61.7
2,600	51.5	52.0	58.4
3,600	49.0	49.9	56.3
4,600	47	48.4	54.8
5,045 (nearest residence)	46.3	47.8	54.2
5,600	45.5	47.2	53.6
6,600	44.1	46.4	52.8
7,600	43.0	45.8	52.2
8,600	42.0	45.2	51.6
9,600	41.0	44.8	51.2

4,000 feet from the fence line. No residences are located within the 55 dBA or the county 65 dBA Ldn noise contour. Therefore, no significant noise impacts would be expected from power plant operation.

Proposed Access Road, Water Pipelines, and Wells

No residences are located in close proximity of the proposed access road and wells; therefore, no significant noise impacts would occur.

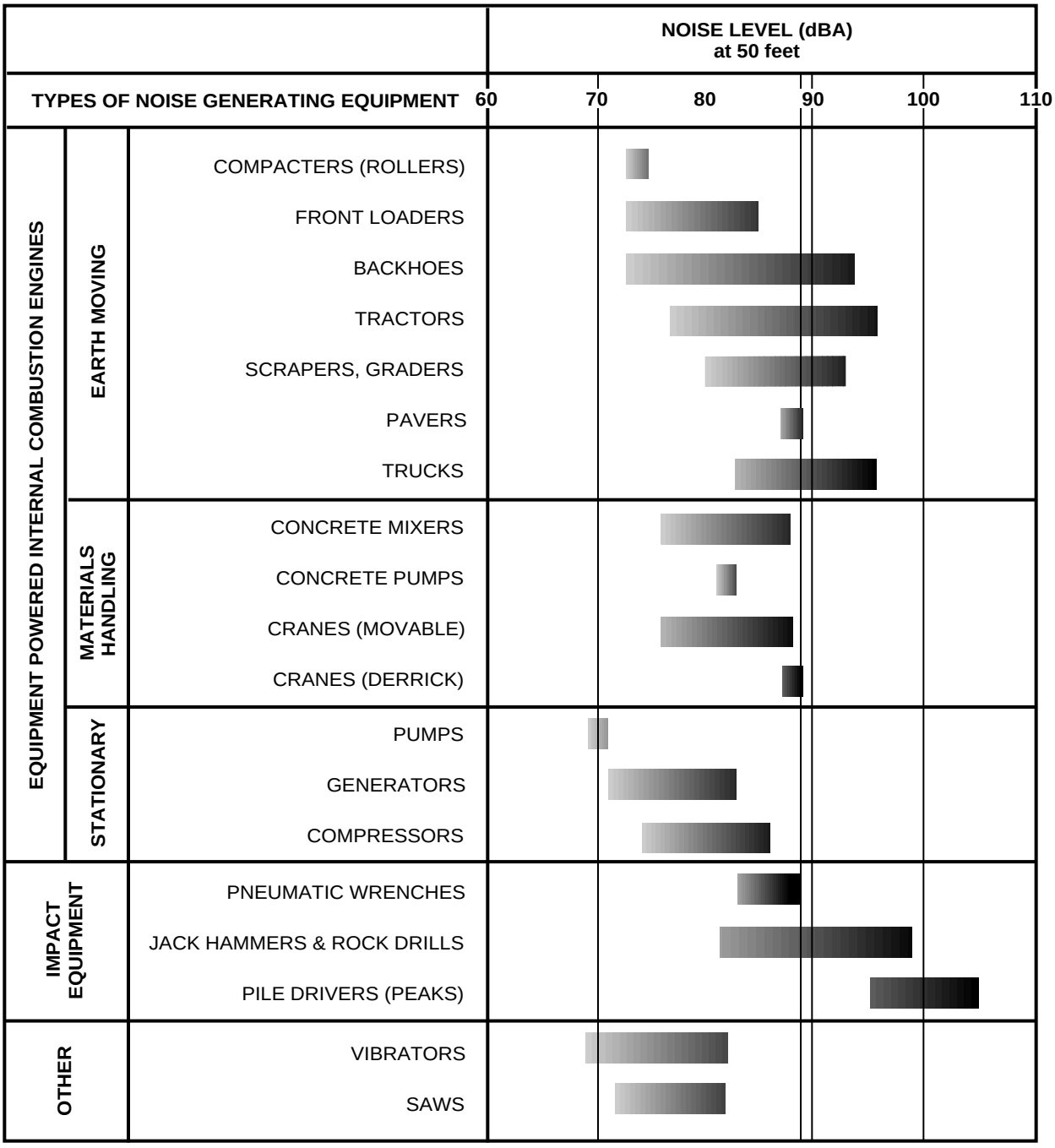
Communication Facilities

Noise impacts from installation of the OPGW option or microwave option would be short term and small in magnitude due to the limited time frame of construction activity. Accordingly, any one location would be affected only for only three to five days for the OPGW, each of the 15 pulling sites would be about 3 miles apart and ground disturbance activities would last only 1 or 2 day(s) of the 75-day construction period at each site. The slightly elevated noise levels associated with construction vehicles would cease after construction or installation activities cease. All of the construction activities are expected to occur within the existing right-of-way and would be temporary.

Proposed Gas Pipeline Corridor

As described in Section 2.0, the corridor for the proposed natural gas pipeline would include corridor segments R1, C1, T3, C3, T4, and R5. Noise sensitive receptors along each corridor segment are described below.

Corridor segment R5 follows the alignment of the proposed access road west to US 93, turns north and follows along the east side of the US 93 to the intersection of the highway and the



Typical Construction Equipment Noise Generation Levels

Figure 3.18-5

Mead-Phoenix Project 500-kV transmission line. This corridor segment crosses the Big Sandy River and through the community of Wikieup. There are four residences that would be located in or near the corridor segment just south of Wikieup.

Through about 2 miles of Wikieup the land in the corridor tends to be partially to completely disturbed by development and ranching activities; there are up to 15 residences and up to 6 businesses, including a gas station, located in or near the pipeline corridor.

Corridor segment T4 parallels each side the Mead-Phoenix Project 500-kV and Mead-Liberty 345-kV transmission lines through a designated 1-mile wide utility corridor. There are four residences located in the corridor, several along US 93; five additional residences are located between the highway and the transmission line corridor. Despite the residences, a majority of this corridor is undisturbed rangeland that is used for grazing.

Similar to corridor segment T4, the land within corridor segment C3 includes relatively undisturbed areas used for grazing. There are no residences located in this corridor segment.

Corridor segment T3 includes relatively undisturbed rangeland, though some development is present toward the northern end of the corridor segment. There is one residence within this corridor segment.

Corridor segment C1 crosses undeveloped rangeland that is used for grazing. The corridor crosses both Old US 93 and US 93. Old US 93 is a well-maintained dirt road that provides access to Windmill Ranch residences (40-acre parcel residential area) and Sierra Vista Estates (residential subdivision in Section 13, T20N, R14W)

Corridor segment R1 parallels Hackberry Road, a dirt road maintained by Mohave County. The corridor crosses through relatively undisturbed rangeland that is used for grazing. Disturbance is limited to access roads, an old mining area (Section 3, T20N, R13W), and one residence located along the east side of the road (Section 3, T20N, R13W).

Noise from pipeline construction is anticipated to be short term and temporary, and would occur only during the daytime hours.

Alternative Gas Pipeline Corridors

The alternative natural gas pipeline corridors follow entirely along road alignments (Alternative R) or entirely along the transmission line alignment (Alternative T). Noise sensitive receptors near each corridor segment, which have not been described under the proposed corridor, are described below.

Corridor segment R4 includes areas east of and adjacent to the US 93 right-of-way. The land is relatively undisturbed and is primarily used for grazing, though there are some scattered residences. This corridor segment also crosses through the Carrow-Stevens Ranches ACEC (refer to Section 3.10). There are about eight residences located within the corridor along the east side of US 93; additional residences are present outside of the corridor segment to the east of the corridor segment and west of US 93.

The land uses present in corridor segment R3 are very similar to those described for corridor segment R4. There are about four residences located within the corridor segment; additional residences are present outside the corridor segment and along the west side of US 93.

Corridor segment R2 follows along Hackberry Road, which is an unpaved public road reportedly maintained by Mohave County. The land in the area is undisturbed; there are no developed uses except one residence that is located outside the corridor segment.

Corridor segment T5 generally follows the Mead-Phoenix Project 500-kV and Mead-Liberty 345-kV transmission lines from the plant site to its intersection with US 93, except for the

area where the corridor segment crosses the Big Sandy River. There are about four residences located in this corridor segment.

Corridor segment T2 is primarily undisturbed rangeland. There are two residences located in the corridor segment and one additional residence just outside the corridor segment.

Land uses in corridor segment T1 are similar to those described for corridor segment T2; there are no residences located in this corridor segment.

Corridor segment C2 follows Old US 93. This corridor segment is narrow, including only the road right-of-way. The land use near the road is generally grazing—there are a few scattered residences (on minimum 40-acre parcels).

Noise from pipeline construction would be short-term and temporary, and would occur only during the daytime during the week.

No-Action Alternative

- The Project would not be developed under the No-Action Alternative. Under this alternative, Project generated sound levels identified in the sections above would not occur.

3.18.2.6 Mitigation and Residual Impacts

- No significant impacts would result from the implementation of the Proposed Action with the actions incorporated to reduce or prevent impacts. No measures to mitigate adverse impacts have been identified for noise. There would be no residual significant impacts.